



DRIVER FATIGUE DETECTION

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ABSTRACT

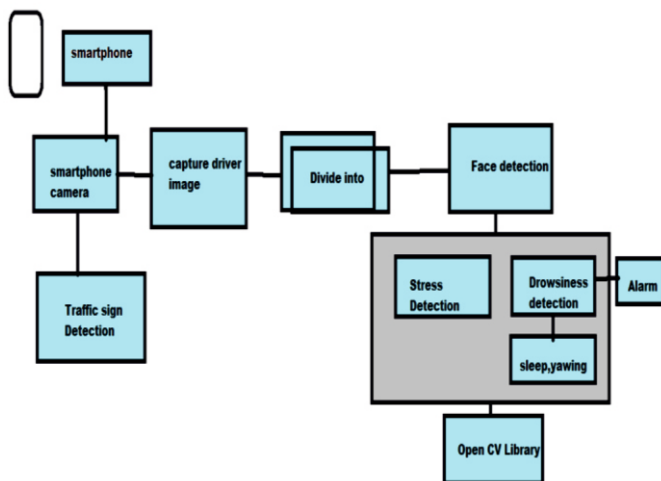
Driver fatigue and drowsiness is a main cause of large number of vehicle accidents. Recent report states that 1200 deaths and 76000 injuries caused annually due to drowsiness conditions. Sleepiness is main issue in large number of accidents take placed. Development of a complete system which will help to prevent drowsiness is a major challenge in accident development system. Current technologies used for detecting driver's fatigue condition uses in physiological signals like heartbeat rate, eye blinking detection and brain activities. But this technique does not have advantages in real world application. Because using electrodes to get signal is very annoying for driver every time and this systems are not cost effective. To overcome all of these problem driver assistance systems is proposed. The purpose of this project is to detect that whether driver is about to fall asleep while driving or not and if driver is in drowsy condition, then give him alert by using alarm or any other device. This will make user alert and will help to prevent accidents during driving.

KEYWORDS: Fatigue, Thrisholding Drowsiness, Assistance, Haar Cascade, Open CV, Blob

I. Introduction

This project is to develop a driver assistance system to detect driver drowsiness by using eye tracking, facial expression tracking and driver's gesture recognition. Eyelid observation and mouth tracking is main factor in driver fatigue detection. The increased risk of security for driving under fatigue or drowsiness conditions and gives count of results occurring from falling asleep while driving. Recent report states that accidents related to driver fatigue is caused are between 2 am to 6 am and afternoon between 2 pm to 4 pm. During this time our body clock is at the lowest point. Males aged 18 to 30 have high risk in driving during this time period. Women are less likely to be involved in sleep related accidents. If a driver continues to drive in fighting sleep then the impairment level is same as over the drink drive limit.

II. Proposed system



- OpenCV provides a way through which live video can be acquired and processed. OpenCV is used to track face from images acquired.
- Eyes are present on the top portion of face i.e. eyes are present at the few pixels below from top of face. Yawning is one of the main symptoms for sleepiness.
- Yawning is detected by tracking open mouth. Driver aided system detect the mouth based on the region of lips tracking. Stress is detected from the driver's expressions.
- In this head rotation and gaze tracking is used to detect rapid head movement. Head rotation is also useful in detecting driver's distraction while driving.

III. Proposed System Modules

- Face Detection
- Stress Detection
- Yawning Detection
- Head Detection

1. Face Detection:

- Cascade file used to detect the file. Haar classifier provides rapid face regions detection in rectangular frames. After detection of face centroid of the face is calculate. Centroid of the face is necessary for accurate eyes and mouth tracking.
- Face detection is the main step in the driver fatigue detection systems. Face detection is a process that aims to locate a human face in an image. The process is applied on stored image or images from a camera.
- Human face varies from one person to another. This variation in faces could be due to race, gender, age, and other physical characteristics of an individual..

2. Yawning Detection:

- If the distance increases then yawning is detected and system will raise alarm to alert driver. Yawning state is detected by measuring both the rate and amount of changes in the driver's mouth contour. After detection of yawning it provides "stop yawning and continue driving" voice alert.
- Yawning is one of the main symptoms for sleepiness. Yawning is detected by tracking open mouth.
- Driver aided system detect the mouth based on the region of lips tracking. Algorithm used for eye tracking can be used for yawning detection.
- Only increased distance between lips are calculated which is possible through black region tracking of open mouth.

3. Head Position:

- Head rotation is also useful in detecting driver's distraction while driving. If driver lean or rotate his head for more than given number of times then system will raise alarm to tell user to focus on driving.
- Rapid head movement also helps to detect the stress condition. In this head rotation and gaze tracking is used to detect rapid head movement. Head rotation is also useful in detecting driver's distraction while driving.
- If driver lean or rotate his head for more than given number of times then system will raise alarm to tell user to focus on driving. It can be useful when driver talks with passengers at back seats or looks at another side rather than looking straight while driving.

IV. Method

• Blob Analysis:

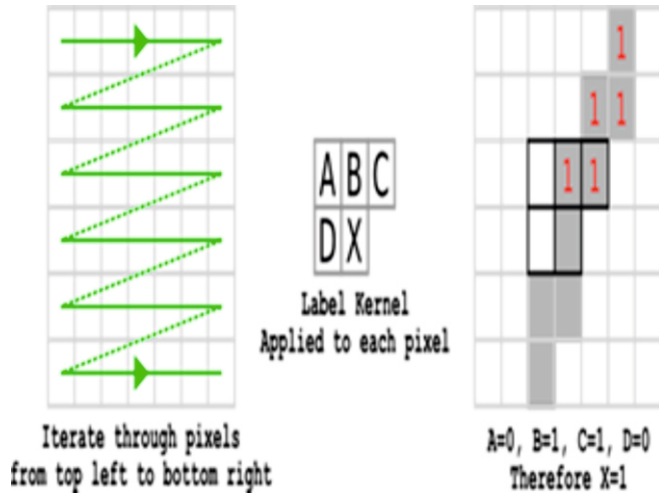
A Blob is a group of connected pixel in an image that share same common property(eg ; gray scale value) in the image above ,the dark connected region are

blobs, and goal of blob detection is to identify and mark there region.

Working of Blob Analysis:

Thresholding :

Convert the source images to several binary images by Thresholding the source image with thresholds starting at min Threshold. These thresholds are incremented by threshold Step until max Threshold. So the first threshold is min Threshold, the second is min Threshold + threshold Step, the third is min Threshold + 2x threshold Step, and so on.



Thresholding Logic

```
gs=(r+g+b)/3; // grayscale
```

```
if(gs<th)
```

```
{
```

```
pix=0; // pure black
```

```
}
```

```
else
```

```
{
```

```
pix=0xFFFFFFFF; // pure white
```

```
}
```

Grouping :

In each binary image, connected white pixels are grouped together. Let's call these binary

blobs. Merging :

The centers of the binary blobs in the binary images are computed, and blobs located closer than min Distance Between Blobs are merged.

Center & Radius Calculation :

The centers and radii of the new merged blobs are computed and returned.



V. Conclusion

Driver Assistance System used to track eyes and mouth of driver to find out and monitor fatigue was developed or not. At the beginning face location tracking is done. After this head and eyes position is obtained through various image processing algorithms. Smartphone continuously catches if the eyes and mouth are opened or closed. When the eyes have been closed for too long, a warning signal using alarm is send to the driver. If mouth is open for too much time then system detects yawning and alert user. Driver assistance system detects face expression of drivers and detects stress from expression and alert driver and passenger if stress is detected. All this processing is performed at the backend of the application and frontend shows route navigation to assist for driving.

VI. REFERENCES

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